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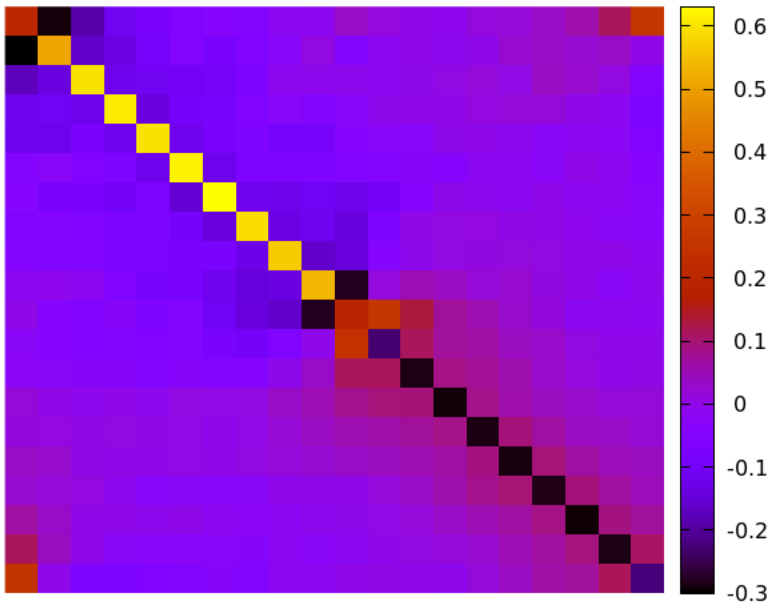
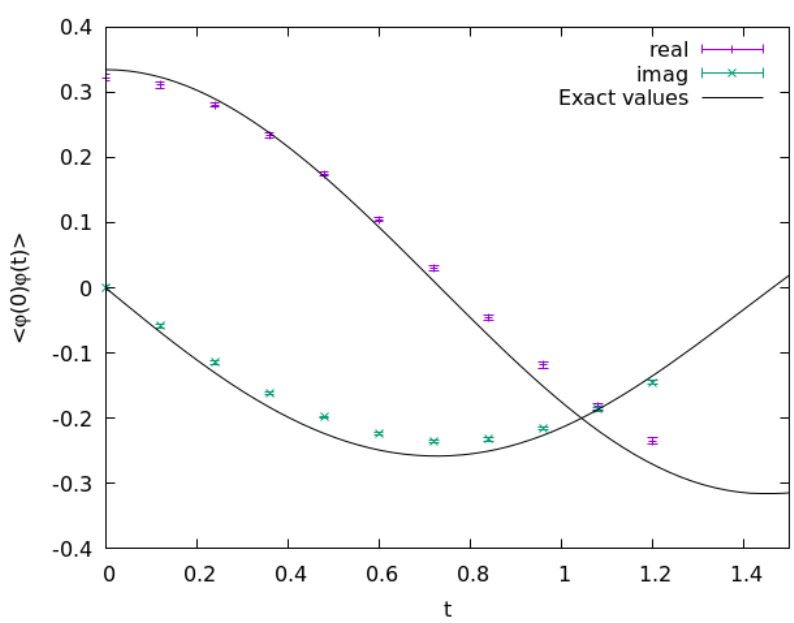
Real-time evolution of a scalar field using the complex Langevin equation

Lattice calculations of real-time dynamics in Minkowski space suffer from the so-called sign-problem, which means that there is a non-positive weight in the path integral and thus one cannot use importance sampling. This lack of a well-defined probability measure can be overcome by complexifying the Langevin equation, which is called complex Langevin approach.
In this talk I will show results from the Langevin equation for a real-time evolution of a scalar φ^4 theory. This approach however fails for longer time-contours, due to the appearance of long tailed distributions in the solution. This is why the aim is to use the freedoms of the Langevin equation with machine learning techniques in order to achieve a correct result.





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